

WHAT IS CLAIMED IS:

- 1 1. A machine-implemented method of encoding a target image of a
2 scene captured at a first image plane, comprising:
3 computing a transformation mapping at least three noncollinear points
4 substantially coplanar on a scene plane in the target image to corresponding
5 points in a references image of the scene captured at a second image plane
6 different from the first image plane;
7 identifying at least one point in the target image off the scene plane and at
8 least one corresponding point in the reference image;
9 estimating a motion between the target image and the reference image
10 based on the computed transformation and the identified corresponding off-scene-
11 plane points; and
12 encoding the target image based at least in part on the estimated motion.
- 1 2. The method of claim 1, further comprising identifying the at least
2 three scene plane points in the target image and the at least three corresponding
3 scene plane points in the reference image.
- 1 3. The method of claim 1, wherein estimating the motion comprises
2 defining single-parameter search spaces each relating points in the reference
3 image to respective points in the target image.
- 1 4. The method of claim 3, wherein defining the single-parameter
2 search space comprises computing an epipole in the reference image based on the
3 computed transformation and the identified corresponding off-scene-plane points.
- 1 5. The method of claim 4, wherein defining a respective single-
2 parameter search space comprises parameterizing an epipolar line extending
3 through the computed epipole in the reference image.
- 1 6. The method of claim 5, wherein a respective single-parameter
2 search space is defined for each block of points in the target image.
- 1 7. The method of claim 6, wherein a respective single-parameter
2 search space is defined by a parameterized epipolar line in the reference image

3 extending through the epipole and a point corresponding to a mapping of a given
4 point in the target image to a corresponding point in the reference image based on
5 the computed transformation.

1 8. The method of claim 3, wherein estimating the motion comprises
2 dividing the target image into blocks of points and computing for each block a
3 respective motion vector representing motion between a target image block and a
4 reference image block.

1 9. The method of claim 8, wherein each motion vector describes a one-
2 to-one mapping between a block of points in the target image and a block of
3 points in the reference image.

1 10. The method of claim 1, wherein encoding the target image
2 comprises representing points of the target image in terms of the estimated
3 motion and motion compensation difference data representing intensity
4 adjustments to points of the reference image for reconstructing corresponding
5 points of the target image.

1 11. An apparatus for encoding a target image of a scene captured at a
2 first image plane, comprising an encoder operable to:
3 compute a transformation mapping at least three noncollinear points
4 substantially coplanar on a scene plane in the target image to corresponding
5 points in a reference image of the scene captured at a second image plane
6 different from the first image plane;
7 identify at least one point in the target image off the scene plane and at
8 least one corresponding point in the reference image;
9 estimate a motion between the target image and the reference image based
10 on the computed transformation and the identified corresponding off-scene-plane
11 points; and
12 encode the target image based at least in part on the estimated motion.

1 12. The apparatus of claim 11, wherein the encoder is further operable
2 to identify the at least three scene plane points in the target image and the at least
3 three corresponding scene plane points in the reference image.

1 13. The apparatus of claim 11, wherein the encoder is operable to
2 estimate the motion by defining single-parameter search spaces each relating
3 points in the reference image to respective points in the target image.

1 14. The apparatus of claim 13, wherein the encoder is operable to
2 define the single-parameter search space by computing an epipole in the reference
3 image based on the computed transformation and the identified corresponding
4 off-scene-plane points.

1 15. The apparatus of claim 14, wherein the encoder is operable to
2 define a respective single-parameter search space by parameterizing an epipolar
3 line extending through the computed epipole in the reference image.

1 16. The apparatus of claim 15, wherein the encoder defines a respective
2 single-parameter search space for each block of points in the target image.

1 17. The apparatus of claim 16, wherein a respective single-parameter
2 search space is defined by a parameterized epipolar line in the reference image
3 extending through the epipole and a point corresponding to a mapping of a given
4 point in the target image to a corresponding point in the reference image based on
5 the computed transformation.

1 18. The apparatus of claim 13, wherein the encoder is operable to
2 estimate the motion by dividing the target image into blocks of points and
3 computing for each block a respective motion vector representing motion between
4 a target image block and a reference image block.

1 19. The apparatus of claim 18, wherein each motion vector describes a
2 one-to-one mapping between a block of points in the target image and a block of
3 points in the reference image.

1 20. The apparatus of claim 11, wherein the encoder is operable to
2 encode the target image by representing points of the target image in terms of the
3 estimated motion and motion compensation difference data representing intensity
4 adjustments to points of the reference image for reconstructing corresponding
5 points of the target image.

1 21. A machine-readable medium storing machine-readable instructions
2 for causing a machine to:

3 compute a transformation mapping at least three noncollinear points
4 substantially coplanar on a scene plane in the target image to corresponding
5 points in a references image of the scene captured at a second image plane
6 different from the first image plane;

7 identify at least one point in the target image off the scene plane and at
8 least one corresponding point in the reference image;

9 estimate a motion between the target image and the reference image based
10 on the computed transformation and the identified corresponding off-scene-plane
11 points; and

12 encode the target image based at least in part on the estimated motion.

1 22. The machine-readable medium of claim 22, wherein the machine-
2 readable instructions further cause the machine to identify the at least three scene
3 plane points in the target image and the at least three corresponding scene plane
4 points in the reference image.

1 23. The machine-readable medium of claim 21, wherein the machine-
2 readable instructions cause the machine to estimate the motion by defining single-
3 parameter search spaces each relating points in the reference image to respective
4 points in the target image.

1 24. The machine-readable medium of claim 23, wherein the machine-
2 readable instructions cause the machine to define the single-parameter search
3 space by computing an epipole in the reference image based on the computed
4 transformation and the identified corresponding off-scene-plane points.

1 25. The machine-readable medium of claim 24, wherein the machine-
2 readable instructions cause the machine to define a respective single-parameter
3 search space by parameterizing an epipolar line extending through the computed
4 epipole in the reference image.

1 26. The machine-readable medium of claim 25, wherein the machine-
2 readable instructions cause the machine to define a respective single-parameter
3 search space for each block of points in the target image.

1 27. The machine-readable medium of claim 26, wherein a respective
2 single-parameter search space is defined by a parameterized epipolar line in the
3 reference image extending through the epipole and a point corresponding to a
4 mapping of a given point in the target image to a corresponding point in the
5 reference image based on the computed transformation.

1 28. The machine-readable medium of claim 23, wherein the machine-
2 readable instructions cause the machine to estimate the motion by dividing the
3 target image into blocks of points and computing for each block a respective
4 motion vector representing motion between a target image block and a reference
5 image block.

1 29. The machine-readable medium of claim 28, wherein each motion
2 vector describes a one-to-one mapping between a block of points in the target
3 image and a block of points in the reference image.

1 30. The machine-readable medium of claim 21, wherein the machine-
2 readable instructions cause the machine to encode the target image by
3 representing points of the target image in terms of the estimated motion and
4 motion compensation difference data representing intensity adjustments to points
5 of the reference image for reconstructing corresponding points of the target image.